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P. O. Box 1964
Indianapolis, IN 46206-1964

February 20, 1984

Mr. Richard G. Phelps
10316 Clark Road
Crown Point, IN 46307

Dear Mr. Phelps:

Re: Land Application
East Chicago Sludge

This letter is in response to the questions addressed to Mr. Doyle in your letter of January 25, 1984. For your convenience, your questions have been reproduced with the answers directly below them.

1. What Cadmium content was used in computing the loading of 0.624 pounds per acre?

Answer

The cadmium content used was 20.8 mg/kg (dry weight). At 15 dry tons of sludge per acre, a loading of 0.624 pounds Cd will result.

2. What is the justification for approving a new permit which exceeds the federal standard of 0.45 pounds of cadmium per acre to be effective January 1, 1987? I assume that the federal government must feel that higher levels of cadmium pose some danger to the public health.

Answer

The present annual cadmium limit is 1.78 pounds per acre. This rate will decrease to 1.11 and 0.45 pounds per acre on July 1, 1984, and January 1, 1987, respectively. Conclusively, the justification for allowing an annual cadmium application of 0.624 pounds per acre is present. For your information, a copy of 40 CFR, Part 257 is enclosed. Please note the discussion of annual and maximum cumulative cadmium loading on pages 53452-54.

3. With the wide spread in analyses for the seven samples submitted, what values are you assuming for copper, lead, nickel, and zinc?

Answer

Values used are as follows:

copper	- 600 mg/kg	nickel	- 399 mg/kg
lead	-1126 mg/kg	zinc	-2495 mg/kg

These values represent the average of seven samples. As a comparison, using the highest reading for each metal, regardless of the sample, zinc would remain the limiting heavy metal and the cadmium application rate is less than 1.0 pound per acre.

4. Lacking complete analysis, is it safe to assume that other metals such as antimony, arsenic, tin, etc., are not present in significant quantities?

Answer

These metals tend to be in relatively low concentrations in municipal sludges and are not significantly translocated into crops. Although this sludge has not been tested by the hazardous waste standards, EP toxicity test, other municipal sludges with much greater levels of metals have passed this test with ease. In fact, no municipal sludge generated in Indiana has failed this test.

5. If stratification in the sludge storage basin exists as suggested by Mr. Eads, what guarantee exists that certain disposal areas will not be drastically overloaded with heavy metals?

Answer

In order to transport this sludge, East Chicago has proposed to liquify the contents of the lagoon. Consequently, mixing of the contents will decrease the effect of stratification in the lagoon. Also see the answer to question 2.

6. What control of soil basicity is guaranteed after the initial lime application?

Answer

In general, agricultural economics will dictate that the soil pH is maintained in the 6.5 range since this level provides the optimum pH for the production of Indiana's major crops.

7. Acid rain with a pH value of 5.5 has been reported in Lake County, Indiana. What will prevent such an acid condition from leaching the heavy metals with the resultant contamination of water supplies?

Answer

The natural soil pH of Indiana's soil tends to be basic in comparison to soils in the Eastern portion of the country. Combined with the addition of lime for crop production and the level of metals applied, leaching will be minimized. Any

effect of acid rain will appear in other environmental areas before leaching from this application is significant.

8. Drainage from the disposal site flows into Beaver Dam Ditch which flows through the City of Crown Point and onto Lake George and Lake Michigan. If leaching occurs due to failure to maintain proper soil basicity, cannot this jeopardize downstream water supplies?

Answer

As an example, ASSUME (1) that cadmium is applied at a rate of one pound per acre (300 acres = 300 lbs of Cd), and (2) all 300 pounds are discharged to Lake George over the period of one year. The average flow from Lake George is 93.5 cfs. Using these assumptions, the cadmium concentration in the effluent from Lake George would be 0.0016 mg/l. The water quality limit for cadmium is 0.02 mg/l. Therefore, it is extremely unlikely that the land application of East Chicago's sludge will jeopardize any downstream water supplies.

9. Assuming leaching or downward migration of the heavy metals does not occur, what would be the impact of these toxic residues on future residential building if this area is subdivided?

Answer

Again, using a hypothetical cadmium application rate of one pound per acre, 454 grams of cadmium would be applied per acre. One cubic foot of soil weighs approximately 100 pounds. At an eight-inch plow depth, the cadmium-soil mixture will be approximately .35 ppm of cadmium. As a comparison, background levels in similar Boone County soils ranged from .41 to 1.2 ppm of cadmium.

Should you have any additional questions, please feel free to contact me.

Very truly yours,

Dan L. Strahl
Group Leader
Land Application Group
Permits Section
Division of Water Pollution Control

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Enclosures
cc: Lake County Health Department